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Alexithymia, Emotional Awareness and Perceived Dysfunctional Parental Behaviors in Heroin Dependents

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Abstract The aim of this study was to analyse alexithymia and deficits in emotional awareness, in heroin addicts, and their relationship with perceptions of early parental interactions. The sample included 99 opiate dependent outpatients and 43 healthy controls. Assessment was performed using the Toronto Alexithymia Scale, the Levels of Emotional Awareness Scale, the Inventory for Assessing Memories of Parental Rearing Behavior, the Mini-Mental State Examination and the Hospital Anxiety and Depression Scale. Findings suggest parental representations, which were mostly characterized by emotional unavailability and a rejection interaction pattern, significantly related to alexithymia. Emotional awareness was associated with the number of years of drug use and methadone level. Negative affect was associated with alexithymia but not to emotional awareness. Regression analyses emphasized the influence of perceived dysfunctional parenting behaviors in alexithymia and difficulties in identifying feelings, particularly an interaction with paternal rejection, moderated by self-reported anxiety. These results are discussed addressing comprehensive issues of emotion regulation and treatment strategies in heroin dependence.

Keywords Alexithymia · Emotional awareness · Parental rearing behaviors · Heroin dependence · Negative affect

Alexithymia has been studied over the past decades in healthy subjects and in a large number of psychiatric disorders, and it seems to be well established as a personality trait that influences

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personal behaviors and physical and mental health conditions. It is a construct characterized by a difficulty in expressing feelings, difficulties in distinguishing between bodily sensations and feelings, a poor fantasy life and a concern with external stimuli (Taylor et al. 1997). It has been considered a paradigm of emotion regulation deficits.

Alexithymia has also been studied from a variety of perspectives in health and social sciences. Psychobiological studies have pointed to physiological deficits in cerebral areas involved in emotion regulation, such as the anterior cingulate, limbic and prefrontal cortex areas (Bermond et al. 2006). Neuropsychological studies showed cognitive impairments in high alexithymic subjects, who failed to recognize affective stimuli with negative valence (i.e. facial expressions of emotions). Empirical and clinical research with a developmental perspective has emphasized alexithymia linked to environmental and psychosocial variables present since childhood and adolescence, such as the poor quality of early parental interactions (Thorberg et al. 2011), attachment style (Wearden et al. 2005), childhood trauma (Krystal 1979) and practices of abuse and neglect (Paivio and Laurent 2001; Taylor et al. 1997; Taylor and Bagby 2004).

It has been proposed that alexithymia involves a pervasive emotional awareness deficit (Lane 2000), with outcomes in quality of life and wellbeing. Several studies suggest that alexithymia is associated with depression or anxiety disorders. Taylor and colleagues (1997) defined alexithymia as a trait deficit in competence to regulate emotions using cognitive strategies, predisposing people to develop disorders related to poor affect regulation such as substance dependence and diverse psychosomatic and psychiatric diseases. Lumley (2000) pointed out that because alexithymia predisposes people to these kind of conditions, it is reasonable that research generally finds high levels of alexithymia among people with those disorders, as well as positive correlations with symptom reports of those diseases. It is suggested that behavioral features of alexithymics probably result from a complex association between the trait and state of different aspects of the same phenomenon, and not as a consequence of the characteristics of the psychiatric disorders (Lumley et al. 2007). This multifactor complexity is still not well studied in several psychopathological fields, particularly in areas related to drug addiction, clinical manifestations the diversity of which requires more research.

Addicted subjects are commonly characterized as people with difficulties in identifying feelings and in regulating them in interpersonal contexts, the descriptions of which are relatively common to alexithymic people (Vanheule 2007a). These deficits may be reinforced by 'drug life-styles', in which the urgency of the drug-use is also neurobiological-dependent and frequently motivates 'psychopathic-like' behaviors that are inherently ways to achieve drugs. Even so, clinic reports have theorized about the presence of emotional deficits most likely determined across development in a good portion of these subjects. Psychoanalysts have contributed their hypothesis about emotion regulation difficulties among drug addicts, emphasizing an early-determined emotional undifferentiation in these individuals (Krystal and Raskin 1970) and the presence of intolerable and uncontainable emotions (McDougall 1984). Moreover other theorists report drug use as a coping mechanism to regulate certain emotions such as anger or sadness, with some similarity to Khantzian's ideas about the self-medication hypothesis (Khantzian 1985).

From a cognitive-developmental perspective, some evidence showed that samples of drug addicts present low levels of emotional awareness for self and others and do not experience emotions as differentiated and symbolized emotional responses. Thus, many addicts seem only to be capable of diminished levels of empathy (Jouanne et al. 2005; Carton et al. 2010), which is compatible with high levels of alexithymia. Similar to other studies with healthy samples (Lane et al. 1996) alexithymia and emotional experience abilities studied in those

drug users samples did not correlate significantly (Carton et al. 2010) although constructs were inversely related as suggested by the literature.

Some authors theorized about emotion regulation deficits as a risk factor for drug use, however there are almost no studies that clarify this assumption because of the lack of longitudinal research. Only one analysis, a prospective study with adolescents (Measelle et al. 2006) showed evidence of the presence of negative emotionality (not depressive symptoms) and deficits in parental support (but not peer support) as predictors for future substance abuse onset in a multivariate model. It suggests that dysfunctional internal-working models developed in the context of early parenting interactions, based on poor supportive parental rearing practices and bonds, may have an impact on modulating pathways for drugs-use.

Andersson and colleagues reported in a sample of drug users associations between perceived poor parental relationships and dysfunctional internal-working models of self and others, as well as significant patterns of paternal rejection and maternal overprotection, compared to a control group (Andersson and Eisemann 2003). These results may contribute to the hypothesis that emotional awareness of self and others is in some way related to the quality of parental representations (or object relations, from a psychoanalytical perspective). Therefore, in drug addiction, deficits in emotional experience may eventually be associated to the internalization of disturbed parental rearing representations and, in this perspective, would not only be a consequence of an emotional deficit resulting from a long-term use of drugs.

The relative absence of studies clarifying associations between developmental issues, drug use pathways and treatment variables supports the need for more research to provide new findings about these theoretical relations. From this point of view it is relevant to test emotional regulation features and their plausible associations with the perceived quality of parental affectivity not only with self-report measures but also with performance measures. Vanheule (2007b) reminds us that variables such as emotional processing or regulation should not be only assessed with self-report questionnaires, because some of their features are implicit and difficult to assess by those measures.

The objective of this study is to describe perceived early parental rearing interactions, alexithymia and emotional awareness in a sample of heroin addicts, compared to a control group, as well as the relationship between those childhood memories and present emotional regulation characteristics in those subjects. First it was hypothesized that these patients would report subjective experiences of parental coldness and rejection in their childhood, which would be positively correlated with alexithymia. We also expected an inverse association between emotional awareness and alexithymia in these patients as well as an emotional functioning mostly composed of basic and undifferentiated forms of experiencing emotions (action tendencies or sensory-motor reflexes). Finally, positive associations between perceived father and mother negative rearing styles and emotional regulation deficits were expected, particularly given that perceived behaviors of parental rejection may predict alexithymia in this clinical group.

Method

Participants

The drug users sample (DG) was collected from three centers for drug addiction treatment, in the city of Lisbon. One was a drug-treatment service at a central hospital and the other two

community-based treatment centers, from the National Institute of Drugs and Drug Addiction (IDT). Inclusion criteria were: 1) having a heroin dependency that was medically stabilized in a methadone substitution program; 2) a minimum of 4 years of school and 3) age between 18 and 65 years old. All participants were also accompanied in regular appointments with a therapist (psychiatrist or clinical psychologist) in individual psychotherapy, group therapy or both. We excluded participants with opiates use in the last 3 months, presence of psychiatric co-morbidity such as mood disorders (major depressive or bipolar diseases), psychotic disorders as well subjects with markedly cognitive deficits previously diagnosed. Those with severe medical conditions such as HIV infection, non-treated hepatitis or oncologic diseases were also excluded. The Ethical Boards of the treatment centers approved this study, in accordance with the provisions of the Declaration of Helsinki, 1995. Clinical staff and Coordinators were informed about the aims of the study and the inclusion and exclusion criteria. One hundred and forty five patients were invited to participate in this study, but only 103 accepted to participate. These provided written informed consent. Ninety-nine participants composed the final sample (five subjects were excluded because of the missing data in multiple items of the psychological assessment).

Healthy subjects (HG) were collected from a blood-donors public center. After the medical screening and before the blood donation, the subjects were invited to participate in this investigation and gave their informed consent. All of the participants were healthy, with no complaints or history of psychiatric conditions or other diseases.

Measures

Participants were initially assessed by a semi-structured interview, with 30 questions, including: 1) socio-demographic variables (age, marital status, educational level, occupation and employment situation); 2) medical conditions and life-events (early separations, psychiatric disorders and drug addictions in the nuclear family); 3) attachment figures and substitutes and drugs use by the drug-users group (age of drugs use onset, what kind of drugs were taken and for how long; present consumptions; years of addiction without any treatment approach; inclusion in therapeutic programs). Interviews included the assessment by the Portuguese versions of the Toronto Alexithymia Scale, TAS-20 (Prazeres et al. 2000), the Levels of Emotional Awareness Scale, LEAS (Torrado and Ouakinin 2011) and the Inventory for Assessing Memories of Parental Rearing Behaviors, EMBU (Canavarro 1996). Participants were also assessed with Portuguese versions of the Mini-Mental State Examination, MMSE (Guerreiro 1998) and the Hospital Anxiety and Depression Scale, HADS (Pais-Ribeiro et al. 2007) for screening cognitive deficits and states of anxiety and depression, respectively.

Toronto Alexithymia Scale, TAS-20

TAS-20 is the most used measure of alexithymia in several countries and languages and it is a self-report scale. Twenty items are rated from 1 (strongly disagree) to 5 (strongly agree). Examples of the items are: “I am often confused about what emotion I am feeling” and “It is difficult for me to reveal my innermost feelings even to close friends”. The sum of all 20 items, taking reversed items into account, was used to produce a total score. Confirmatory factor-analysis of the Portuguese version supports the three-factor model of the original scale (‘difficulty identifying feelings’, DIF; ‘difficulty describing feelings’, DDF and ‘externally oriented thinking’, EOT). Values for internal consistency (Cronbach’s alpha, α=.79) and test-retest stability over time (r=.90 for 3 weeks between two assessment moments, p<.001) confirm very good reliability levels of this version (Prazeres et al. 2000).

Levels of Emotional Awareness Scale, LEAS

The LEAS is a written behavioral measure that asks the subject to describe his or her anticipated feelings, and those of another person, according to each of 20 vignettes described in two to four sentences. It is a measure based on a cognitive-developmental model of emotional experience, influenced by the Piaget and Werner & Kaplan theories of cognition and knowledge. Highly reliable structural scoring criteria are used to evaluate the degree of differentiation and integration of the words denoting emotion that are attributed to the self and to the other person.

One scene is presented per page, and two questions are done: "How would you feel?" and "How would the other person feel?". Each response is scored separately or the emotion described for the self and the other person. The lowest score (level 0) is for non-emotional responses in which the word "feel" is used to describe a thought rather than a feeling. Level 1 reflects an awareness of bodily or physiological cues (e.g., "I'd feel tired"). Level 2 consists of words frequently used to convey relatively undifferentiated emotion (e.g., "I'd feel bad") or use of the word "feel" to convey an action tendency (e.g., "I'd feel like punching the door"). Level 3 responses involve use of one word conveying typical, differentiated emotion (e.g. sad, angry, happy, surprised). The highest score for the self and the other person, level 4, is given when two or more level 3 words are used that convey greater emotional differentiation than either word alone. Each subject thus receives separate scores of 0 to 4 for the self and other responses. A third "total" score is given and it is equal to the higher of the self and other scores, except when both responses receive level 4 scores. In those circumstances, a total score of level 5 is given for the scene if the emotions for the self and other person can be differentiated from one another. Only results using the total score are reported. The ratings are based exclusively on structure and do not require any rating for appropriateness of the responses.

Higher scores reflect greater differentiation and awareness of emotional experience in the self and others and a relative lack of alexithymia. Previous research showed that the LEAS score correlated positively with cognitive-developmental measures (Lane et al. 1990). The LEAS score also correlates positively with the degree of right hemispheric dominance in the judgments of facial emotions (Lane et al. 1998) and the degree of blood flow in the anterior cingulate cortex during induced emotions tasks (Lane et al. 1995). Psychometric studies of the Portuguese version showed very good qualities of reliability and validity (Torrado and Ouakinin 2011). *Cronbach' Alpha* Coefficients for self, other and total were high (α=.85, .82 and .87, respectively, n=176) as well as interrater reliability (r (n=112) = .998, .998, .999, p<.01) and test-retest correlations for (ρ (n=25) = .795, p<.001). In this study short-form LEAS-A was used (one of the two parallel forms which compose the complete scale). Protocols were coded and jointed to protocols from other samples. Only one rater scored all protocols, without knowing what group each protocol came from. Ten items compose LEAS-A and it is strongly correlated with LEAS total score and the other short-form (r=.94 and .77, p<.01), also presenting good internal consistency (α=.79 for n=52). LEAS-A total score showed in Portuguese studies a relevant correlation with externally-oriented thinking, the 3rd factor of TAS-20 (r=−.32, p<.05), supporting the construct validity of this form.

Inventory for Assessing Memories of Parental Rearing Behaviors, EMBU

The quality of early interactions with attachment figures and perceived parental rearing behaviors were assessed by the Portuguese abbreviate form of the EMBU questionnaire, with 23 items, presented separately for fathers and mothers. This version was developed by

Canavarro (1996) and supported in the models by Perris et al. (1980) and Arrindell et al. (1994). This is one of the most widely used instruments in this field, answered on a 4-point Likert scale. EMBU's factorial invariance across different cultures was demonstrated by Arrindell et al. (1994). Multiple studies (e.g. Canavarro 1996; Arrindell et al. 1999, 2001) have given support to a 3-factor solution with three factors ('rejection', 'emotional warmth' and 'overprotection'). The 'Rejection' factor was defined as a behavioral pattern focused on changing child motivations such as applying physical punishments and depriving him from objects or good things, in a context of emotional coldness. The 'Emotional warmth' factor was defined by parental behaviors that comfort their son and validate himself as a person, resulting from the frequencies of behaviors suggesting approval, encouragement and physical and verbal expression of positive feelings towards him. The 'Overprotection' factor refers to a perceived parental controlling pattern, including intrusive behaviors, submitting or infantilizing the son and excessive proximity behaviors in order to prevent the autonomy of the son. Portuguese studies on its psychometric qualities show good estimators of reliability (*Cronbach's Alpha* of .661 and .542, for mother and father scores, respectively) and validity (confirmatory factor analysis showed that three factors explain almost half of the variance of responses). Researchers have demonstrated the high stability of reported parental rearing behaviors during significant clinical changes in the severity of psychiatric illnesses and, more specifically, of depressive disorders, excluding the hypothesis that the patients' mostly negative reports of their parents' rearing behavior were due to their depression-biased autobiographical memories (Richter and Eisemann 2000; Gerlsma et al. 1994).

Statistical Analysis

Statistical analyses were generally conducted with the Statistical Package for the Social Sciences (SPSS), version 19 for Macintosh. All statistical tests were two-tailed. Unless otherwise specified, $p<.05$ was assumed to define statistical significance.

Comparisons between independent samples and associations between parental rearing behaviors, alexithymia and emotional awareness were performed through Mann–Whitney Non-Parametric Tests or Spearman Correlations and associated significance tests, respectively, since assumptions of normality of variables were not met. Multiple regression analyses were carried out to test the effects of predictors on dependent variables. Moderation effects were also tested on the association between particular independent and dependent variables.

Results

Samples Description

The DG was mainly composed of male participants (72 %, $n=71$) aged less than 40 years old (50 %), with almost half of the sample living with his or her partner (41 %) and having a high-school level of education (43 %). About 69 % of the sample was employed, working in public or commercial services (47 %). Some had physical co-morbidity (29 %) especially liver diseases such as hepatitis C (17 %), although in all cases these conditions were medically stabilized. Most of the assessed subjects started using drugs at the late adolescence with no more than 19 years old (median value), the mean-age of the first drug use being 20 years old. All participants reported heroin as the preferred drug but some of them started their drug use with other substances. A part of the sample used other drugs simultaneously

with opiates (37 %), mainly combinations of cocaine, cannabis and alcohol. Some reported presently maintaining irregular drug uses combining cocaine with cannabis (19 %) but abstaining from opiates. Participants were under agonist maintenance treatment for 70 months on average, stabilized with methadone (x^{-}=54 mg). About 25 % of the patients identified psychiatric problems in their original family. In this particular group 29 % reported people in their nuclear family with diagnosed depression and 21 % mentioned the presence of a mental health diagnose which they could not specify. Almost half of the sample reported early separations in the nuclear family during childhood and adolescence (49 %, n=47), mostly due to divorce or separation of the parents (35 %). About 91 % lived their early years with their mothers, contrasting with only 60 % who also lived with their father. Of the patients who did not report the regular presence of the father 67 % had relatively close contact with him and only 20 % reported a substitute father figure.

DG patients were assessed in three different treatment centers but the groups were homogenous and showed no significant differences in all variables measured except the number of years in the present treatment (χ^2_{KW}=11.46; df=2; p=.003). Multiple comparisons tests identified only one group as being different from the others (p<.05). However, Spearman correlations were not significant with any of the psychometric variables studied (p<.05) excluding differences between the three groups of individuals, so we analysed the participants results as a whole. For participants who reported some drug use at that moment, non-parametric tests did not relate them with any of the psychometric variables studied (alexithymia, emotional awareness, perceived parental rearing behaviors). Scores on MMSE also did not show associations with alexithymia, emotional awareness or parental rearing memories in both groups.

This study considered a cut-off threshold on HADS of 11 for depression and anxiety (Pais-Ribeiro et al. 2007), for which a score of 11 or higher points to the presence of a mood disorder and a score of 8 to 10 being suggestive of an eventual presence of the respective state (Snaith 2003). DG showed relatively low levels of anxiety (mean = 8.3; SD=4.5; median = 7.0) and depression (mean = 5.9; SD=4.0; median = 7.0).

HG and DG participants were homogenous in age, gender, HADS and MMSE scores. They were significantly different regarding marital status (17 % of the DG participants were married against 47 % in the HG), employment situation (about 29 % of the DG's were unemployed, against only 7 % of the HG's) and the presence of a physical disease (98 % of the healthy participants did not report diseases).

Perceived Early Parental Rearing Behaviors

The mean results of the DG on EMBU showed significantly lower levels of perceived emotional support by mothers or substitutes. It is also relevant to highlight a poor paternal emotional support and a rejection pattern reported by the DG, compared to controls, although these results did not reach statistical significance (U=1653,5, p=.055; U=1664,0, p=.059, respectively). Perceived rejection mothering patterns in our sample did not show significant differences compared to the general population sample. The perceived overprotection pattern in mothers through childhood and adolescence is significantly more pronounced in general population sample, whereas perceived overprotective paternal interactions did not differ between samples (Table 1).

Alexithymia, Emotional Awareness and the Quality of Emotional Experience

DG participants showed significant high levels of alexithymia total score and in the factor 2 (DDF) and significant lower levels of emotional awareness (self, other and total scores) (Tables 2 and 3). Medians showed a major frequency of responses using words typically used for expressing

Table 1 Results for DG and HG participants on EMBU

Mean ranks on EMBU dimensions						
Samples non-parametric test	EWF	RF	OF	EWM	RM	OM
DG (*n*=99)	66,70	75,19	70,60	66,61	71,38	68,09
HG (*n*=43)	81,13	61,12	71,94	82,76	70,77	79,35
Mann Whitney *U*	1653,5	1664,0	2039,5	1644,5*	2117,0	1791,0

EWF (Emotional Warmth EMBU-Father); *EWM* (Emotional Warmth EMBU-Mother); *RF* (Rejection EMBU-Father); *RM* (Rejection EMBU-Mother); *OF* (Overprotection EMBU-Father); *OM* (Overprotection EMBU-Mother)

*$p<.05$

undifferentiated emotional states or action tendencies (level 2), bodily sensations (level 1) and cognitions instead of feelings (level 0). Though these subjects seem to show fewer competencies for symbolizing emotional experience through language. Only three of the ten items of LEAS responses were mainly scored as level 3 and not as level 2. Non-parametric tests did not identify differences in the scores of alexithymia and emotional awareness between participants who reported early negative life-events (e.g. separations from attachment figures in childhood or occurrence of psychiatric conditions in the family of origin) and other participants without those events in their childhood.

No significant differences were found between male and female patients on LEAS scores (Self: $t=-1.05$, $p=.296$; Other: $t=-.79$, $p=.431$; Total: $t=-1.96$, $p=.052$) although in three different scores men showed lower mean results in emotional awareness than women. Men and women also did not differ significantly on TAS-20 scores (Total: $t=-.549$, $p=.585$; DIF: $t=-1.062$, $p=.291$; DDF: $t=-.596$, $p=.553$; EOT: $t=.751$, $p=.454$).

No significant correlations were found between TAS-20 and LEAS total scores, even though they related negatively as literature suggest ($r=-.049$, $p=.555$).

Bivariate Relations Between Emotional Deficits, Parental Rearing Behaviors, Negative Affect and Variables Related to Drug use and Treatment

We tested correlations between parental rearing behaviors, alexithymia, emotional awareness and different variables related to drug-use and treatment. LEAS scores did not correlate with any of the EMBU dimensions, however TAS-20 scores showed a significant correlation with rejection patterns perceived in early interactions with both parents. Difficulties in identifying feelings (DIF) also correlated with behavioral patterns of rejection from both attachment

Table 2 Results for DG and HG participants on TAS-20

Mean ranks on TAS-20 for DG and HG participants			
TAS-20 factors	DG (*n*=99)	HG (*n*=43)	Mann–Whitney *U*
Total	76,29	60,47	1654,0*
DIF	74,94	63,57	1787,5
DDF	76,06	61,01	1677,5*
EOT	75,13	63,15	1769,5

DIF difficulty identifying feelings; *DDF* difficulty describing feelings; *EOT* externally-oriented thinking

* $p<.05$

Table 3 Mean results on LEAS for DG and HG participants

Mean results on LEAS and *T*-test			
LEAS scores	DG (n=99)	HG (n=43)	*T*-test
LEAS-S	20.58 (5.35)	24.59 (5.85)	−6,25***
LEAS-O	16.60 (5.92)	21.39 (5.34)	−5,00***
LEAS-T	23.59 (5.51)	28.76 (5.33)	−5,85***

LEAS-S (LEAS-Self); *LEAS-O* (LEAS-Other); *LEAS-T* (LEAS-Total score)
*** p<.001

figures, in a very significant way (p<.01). Emotional expressing deficits (DDF) were related with overprotective features perceived in mother behaviors. These associations were not present in the HG.

Although the scores on HADS did not suggest a co-morbid mood disorder with opiate addiction, but only eventual anxious or depressive states in some of the DG participants, we tested separate associations with parental rearing behaviors, alexithymia and emotional awareness. No significant associations were found for LEAS scores, but several significant correlations were found: 1. HADS-D related negatively with maternal emotional support; 2. positive associations between parental rejection and HADS-A and HADS-D were found; 3. anxiety correlated with alexithymia and all the three factors (although less significantly related to EOT); and 4. depression was related to alexithymia profile except to EOT (Table 4).

TAS-20 and EMBU scores did not present any associations with the reported age of onset of drug use, number of years of regular drug-use, years of integration in the present therapeutic program and methadone dose. On the other hand, LEAS showed significant correlations with those variables related to drug use career and treatment except with the number of years in the present therapeutic program (Table 5).

Regression Analyses and Moderation of Parental Rejection Effects on Alexithymia by Negative Affect

Regression analyses were performed using HADS-A and HADS-D separately as moderators. For each model, the usual regression assumptions were studied regarding linearity,

Table 4 Significant correlations (Spearman) between EMBU, TAS-20 and HADS scores

EMBU and HADS								
TAS-20 and HADS	EWF	RF	OF	EWM	RM	OM	HADS-A	HADS-D
TAS-20 total scores		.314**			.229**		.542***	.401***
DIF		.311**			.217**		.548***	.403***
DDF						.271**	.410***	.339**
EOT		.223*					.216*	
HADS-A		.332**			.275**		1.000	
HADS-D		.275**		−.240*	.252*			1.000

HADS-A (Anxiety measured by HADS); *HADS-D* (Depression measured by HADS)
* p<.05 ** p<.01 *** p<.001

Table 5 Significant correlations (Spearman) between LEAS and drug use variables

Drug use variables			
LEAS scores	Drug use onset	Years of drug use	Methadone dose
LEAS-S		−.233*	−.289**
LEAS-O	.222*	−.297**	−.212*
LEAS-T	.206*	−.256*	−.248*

* $p<.05$ ** $p<.01$

multicollinearity, errors, etc. For the presented models with moderation effects, the R-squared were always higher than 0.3 and the regression ANOVA's showed significant p-values at the usual levels of 1 % and 5 %.

Considering anxiety as a moderator, TAS-20 Total score was significantly and positively associated with RF and with the moderator's main and interaction effects (Table 6). When the regression model is developed with DIF as a dependent variable, DIF is also significantly and positively associated with RF and with the moderator's effect. In this last model, the R^2 explains 37 % of the variance (Table 7).

Squared correlation coefficients of 0.339 and 0.374 are not very high and one usually hopes for higher values when estimating regression models in general. Nevertheless, in this case, lower values of R^2 were to be expected, since the dependent variables used in both models (TAS-20 total score and DIF) are in reality "dependent" on other dimensions that were not considered in these models. Our aim here is to focus on a pair of two of the most important dimensions of all the possible dimensions that make TAS-20 and DIF vary and analyze also how the interaction between these two variables may relate to the dependent variable. With that in mind, a model that explains more than 30 % of total variance is an adequate model.

Anxiety does not moderate the interaction between maternal rejection and alexithymia. Interactions between parental rejection patterns and alexithymia were also not moderated by depression. Other models with regression analyses were carried out with LEAS but they did not show a good global adherence. Nevertheless, a simple regression model pointed to the number of years of drug-use as a factor with impact on LEAS-Total and LEAS-Other scores (LEAS-Total: R^2=.139; *Regression: ANOVA,* F=7.770, p=.001; LEAS-Other: R^2=.142; *Regression: ANOVA,* F=7.293, p=.001).

Table 6 Regression model with moderation of paternal rejection effects on alexithymia by anxiety

Regression model with TAS-20 total score as dependent variable							
Variables	B	S.E.	β	t	Sig.	95 % confidence interval for B	
						Lower bound	Upper bound
(Constant)	52,639	1,201		43,839	,000	50,255	55,023
RF_centered	,612	,245	,215	2,502	,014	,126	1,098
HADS-A_centered	1,425	,267	,460	5,339	,000	,895	1,955
RF × HADS-A centered	,133	,065	,172	2,039	,044	,004	,262

R^2 =0.339 Regression. ANOVA: F=16.271 p=.000

B = unstandardized coefficient; S.E. = standard error; β = standardized coefficient

Table 7 Regression model with moderation of paternal rejection effects on 'difficulties identifying feelings' (DIF) by anxiety

Regression model with DIF as dependent variable							
Variables	B	S.E.	β	t	Sig.	95 % confidence interval for B	
						Lower bound	Upper bound
(Constant)	18,018	,635		28,380	,000	16,758	19,279
RF_centered	,389	,129	,252	3,007	,003	,132	,646
HADS-A_centered	,789	,141	,469	5,591	,000	,509	1,069
RF × HADS-A centered	,073	,034	,174	2,123	,036	,005	,142

R^2 =0.374 Regression. ANOVA: F=18.900 p=0.000

B = unstandardized coefficient; S.E. = standard error; β = standardized coefficient

Discussion

The present study explored representations of early attachment experiences with parental figures, recalled by subjects with a history of drug addiction compared to controls, and tested theoretical and clinical hypotheses about their associations with present emotional recognizing and expressing difficulties and levels of emotional awareness. Findings suggest that these patients perceived parental interactions, through childhood and adolescence, mostly characterized by unresponsiveness and rejection patterns of relationship. These recalled patterns influenced alexithymia reported on TAS-20, but did not the emotional awareness measured by LEAS, which seems to be partially influenced by the long-term use of drugs.

This perceived model of early nurturing, perhaps related to a certain absence of an emotional warmth milieu where labeling and expressing emotions are not privileged, was significantly reported by DG as linked to poor supportive mothering behaviors, although alexithymia was particularly associated to rejection patterns of interaction identified in both parents, specifically in the father figure. In a previous research (Torrado and Ouakinin 2008) we also found similar contents in self-reports of patients with opiate addiction about their father's bonding established in the early stages of development: a large perceived pattern of emotional distance from the father figure, characterized by affectionless control behaviors (high control, low care). This profile is also in agreement with clinical literature, which highlighted a common prototype of paternal rejection perceived by opiate-addicted patients in childhood and adolescence (Jurich et al. 1985; Torresani et al. 2000; Andersson and Eisemann 2003). This pattern, however, is not in accordance with some conceptions about a typical maternal controlling attitude in this population, which was not verified in the present study.

Differences from literature in our results may reflect the use of different measures of perceived early-caregiving behaviors. Other psychometric instrument commonly used in other researches for studying this domain, the Parental Bonding Instrument (PBI), although relatively similar to EMBU in terms of its content and number of items, only comprises two subscales (care and overcontrol) and do not emphasize the dimension of the rejection.

These patients showed significant levels of alexithymia, compared to a general population sample. This result was also found for DDF, supporting a global emotional impairment on dealing with feelings plus a particular difficulty in describing feelings to others, which is frequently observed in clinical settings with these patients.

Alexithymia and DIF were strongly related to perceived rejection interactions by mother and father throughout childhood and adolescence, pointing to an early development in these

subjects characterized by the presence of poorly responsive attachment figures to emotional needs, promoting possible early determined deficits in self-regulation abilities, as literature suggests (van der Kolk and Fisler 1994).

Controlling patterns of interaction perceived by DG participants in maternal figures were significantly associated with DDF, an association previously outlined in high alexithymic people identified in general population samples (Thorberg et al. 2011). Considering interactions with parental figures a core element of early attachment theory, and its quality hypothesized as a protection or a risk factor for alexithymia, further investigations with larger samples are needed to clarify the role of dysfunctional rearing patterns in the development of early difficulties for describing emotional internal states and how these difficulties may participate in the onset of drug abuse. Although no significant associations were found between parental rearing behaviors and the age reported of the onset of drug use in this DG sample, other studies are required.

As literature suggests (Carton et al. 2010; Jouanne et al. 2005) LEAS scores in DG were significantly lower than in HG, both in awareness of self and others' emotions. Performances on LEAS pointed to fewer competencies in these patients for symbolizing emotional experience by explicit and differentiate forms, providing additional evidence for difficulties in processing and expressing the experience of distinct and complex emotions. These findings suggest that these patients markedly show characteristic styles of affect regulation that deemphasize verbal expression in favor of implicit and action-oriented ways of expression. According to the results, this profile seems to be increased by the long-term use of drugs and, somehow, associated with the age of onset of drug use and methadone dose prescribed, which leads to the hypothesis that these individuals may develop some kind of particular affect regulation style according to their development, which may be modulated by their early initiated drug use career. These deficits seem to become more evident in a performance measure like LEAS. Moreover, the impact of the long-term use of drugs in cerebral areas (i.e. prefrontal and orbitofrontal cortex, limbic regions) may produce additional impairments in decision-making and other executive functions, influencing self-awareness, interpersonal relationships and empathy, the core issues assessed by LEAS.

Inversely to what we were expecting, scores on LEAS did not relate to any of the parental rearing patterns recalled by EMBU. These results may be partially explained by the distinct nature of the measures used in this study. LEAS is a performance measure, requiring different capacities (i.e. psycholinguistic, be aware of and represent feelings) to those required in a self-report scale for characterizing the quality of parental interactions through early stages of development, which mostly involves autobiographical memories. Perhaps using a different measure for assessing parental representations with a similar assessment nature, such as Parental Descriptions Scale (Blatt et al. 1979), could provide new findings for understanding the role of the internalized parental responsiveness patterns in the cognitive-developmental structure of the emotional experience.

LEAS scores did not correlate with TAS-20 scores suggesting (like previous studies) that these two scales, even though measuring conceptually linked constructs, are not interchangeable. Whereas TAS-20 is a self-report scale specifically developed to assess alexithymia, LEAS was created to describe emotional experience organization and the differentiation of cognitive schemata involved in emotional processing. Nevertheless, deficits in the ability of being consciously aware of and to symbolize emotions may be related to the alexithymia features. Lane et al. (1998) pointed out that these two measures may be complementary, as they appear to measure different features of the sensitivity to internal emotional states.

The scores on anxiety and depression, although below the usual cut-off, were both related to TAS-20 total scores, DIF and DDF. These results are consistent with Taylor and colleagues'

clinical and empirical considerations about alexithymia, considering it a trait deficit which influences a person to develop disorders related to reduced cognitive strategies for emotional regulation, so it is expectable to be correlated with symptom reports of negative affect, typical of those conditions. From a similar perspective Lumley (2000) considered that alexithymia generally predispose to a negative emotional valence, in a way that people who are more alexithymic fail to regulate and modulate negative emotions in stressful events, promoting unremitting difficulties to lead with those emotions. This fact is particularly relevant in a clinical population such as substance-dependents, who frequently relapses when faced with demanding or hard emotional situations. Drug users who are more alexithymic probably show less cognitive strategies to deal with these situations and disruptive emotions, which may strengthen their consumption patterns or the risk of relapse. Although negative affect may be linked to TAS-20 scores, Lumley reminds us that empirical findings reporting that TAS-20 is not a consequence of it. In relative accordance with literature (Lumley 2000), in our study EOT did not correlate with depression (although it was related with anxiety), and the same was observed with LEAS scores. Subic-Wrana et al. (2005) suggested that perhaps the measurement of the words used to express affect, provided by the LEAS scoring system, captures better the deficits in symbolizing capacities at a level that is not substantially interfered by negative affect, than does TAS-20. These considerations support the relevance for considering both measures in assessing emotional regulation deficits: one of them seems to be more sensitive to the presence of negative affect and to emotional developmental dimensions, and the other one more specific in measuring the representational abilities or deficits in a way that seems to be less interfered by the quality of affect.

Regression analyses showed that perceived early parental rejection patterns influence alexithymia reported by these heroin dependents. Whereas maternal rejection relates linearly with alexithymia, interaction between paternal rejection and alexithymia is substantially moderated by anxiety reported on HADS. These findings are relatively new, to our knowledge, suggesting that alexithymia in these individuals seems to be determined by a perceived early disturbed-parenting relationship, as some authors suggest (Taylor et al. 1997), and it is as much influenced by paternal rejection as self-reported anxiety increases. We hypothesized that the 'symbolic father', an important provider of limits internalization through development, is probably less preserved in this population since childhood and adolescence due to the absence of an emotional supportive paternal relationship that would be required for developing a sense of self and others, internal boundaries and a more differentiated emotional consciousness. This internal working model of rejection from others, determined in an early attachment context, may be extended to other significant relationships, in a way that reinforce the characteristics of alexithymia, specially in the presence of anxiety. Perhaps this pattern of functioning is not far from the experience of some adolescents dealing with peers, by whom they want to be accepted. The perception of a possible rejection from others may increase difficulties in knowing what they are feeling, to think clearly about it and to behave properly, in a way that these dysfunctional skills of emotional self-regulation may contribute to rejection by mainstream peers (Hovdestad et al. 2011). In the presence of anxiety, but also self-derogation feelings (Taylor et al. 2005), the contact with some substances may be viewed by some individuals as a form to decrease their social distress, as Gross and Thompson pointed out (2007), which highlights the role of the negative affect for increasing the difficulties to regulate emotions and rejection thoughts and feelings, both particularly relevant for establishing contact with psychoactive substances.

Alexithymia has also been described as a potential risk factor for establishing a good therapeutic alliance and adhering to a rehabilitation process (Krystal 1979; Taylor et al. 1997) particularly with drug-users (Ziolkowski et al. 1995; Cleland et al. 2005). Our findings underline the relevance in offering a therapeutic process to these patients that helps them to explore and

recognize these early experiences with attachment figures in the past, which were probably repeated in some way within significant relationships with peers and other people, in order to minimize the present emotional experience difficulties, which seem to block their rehabilitation. The core of the interventions does not have to be strictly focused on the past, but rather on how the past sheds light on current difficulties in dealing with emotions. In the context of the broader extent of the treatment program, psychological interventions may be extremely important to help these patients in being abstinent, in the remission of addictive behaviors that deeply shapes their lives and their emotional experience abilities. Additionally it can also help these patients to better understand their history and to progressively change some specific attachment representations of the past experience. This increasing labor may be determinant to increase flexibility and decrease or weaken in some way the mainly externally-oriented cognitive style, through a new process of labeling the emotional experience, self-reflection and self-exploration that takes place in the context of a safe, supportive and non-rejection relationship between therapist and patient.

Limitations of the Study and Directions for Future Research

There are several limitations that need to be acknowledged. The first limitation concerns the cross-sectional study design, which allows some limited inferences. Second, we consider that it would be relevant to replicate this study in other samples such as in therapeutic-communities for drug addiction rehabilitation or other treatment programs, because findings may not be extended to other inpatient or outpatient settings. Third, we consider it appropriate to study interactions between emotion regulation variables and perceived early parental rearing behaviors in completely abstinent samples in order to verify if these findings are in some way generalizable. In future studies it may also be relevant to collect a larger control group, at least two times bigger than the clinical group, in order to make easier the matching procedures of subjects and to maximize the inferences.

This study explored main parental representations from childhood and their rearing behaviors, levels of alexithymia and emotional awareness and associations between them in a sample of people with opiate addiction, compared to controls. Alexithymia seems to be associated with, and in some part explained by, dysfunctional parental rearing behaviors and negative affect, supporting a developmental perspective of these emotional deficits. Emotional awareness particularly related to drug use career and the use of opiates, including methadone. Perhaps these two measures of the ability to contact with emotional inner states, in this population, bring some evidence of different dimensions of a same phenomenon with clinical impact in treatment. Difficulties in regulating emotions in this sample appear to have connections with perceived early dysfunctional practices of parenting and also with consequences of the long-term use of drugs.

Future research and prospective studies with adolescents and young adults may provide new findings about the impact of alexithymia, representations of early attachment caregivers and internal working models of self and others in the circumstances of the drug use onset, the patterns of substance use and misuse and the severity of the addictive behaviors.

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